

2006 RESEARCH PROBLEM STATEMENT

Problem Title: Evaluation of the Safety and Design Integrity of Two-Lane Rural Highways Using the Interactive Highway Safety Design Model (IHSDM) Developed by FHWA **No.:** 06.06-2

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1. Briefly describe the problem to be addressed:

Two-lane rural highways comprise 77% of the nation's highway systems. Although VMT wise, they do not carry as much traffic as freeways and other major multi-lane highways, their share in the fatal crashes accounts for 44%. Head-on collisions and run-off the road crashes are some of the major crashes that two-lane rural roads experience. For instance, The US 6 has experienced a high number of crashes in spite of UDOT's efforts to improve the highway and UDOT has decided to upgrade it to a four-lane highway from Spanish Fork to Green River in the near future. It has been difficult to systematically evaluate the integrity of two-lane rural highways from various design and safety aspects. FHWA recently completed a suite of software programs named Interactive Highway Safety Design Model (IHSDM) that would help the engineers conduct crash prediction, design consistency evaluation, intersection review, policy review, and traffic analysis for two-lane rural highways. The availability of this software provides an opportunity for UDOT's design, operation, and safety engineers to evaluate two-lane highways with high crash occurrences from various aspects in order to identify improvement alternatives that would be most cost effective. It is necessary to proactively evaluate the need for improvement rather than reactively respond to the crashes that have occurred. IHSDM can be used to evaluate existing two-lane highways as well as newly planned two-way highways and can be effectively incorporated with safety audit practices.

2. List the research objective(s) to be accomplished:

1. Evaluate the capability of IHSDM using selected two-lane highways experiencing high crash rates as case studies.
2. Evaluate the usefulness of IHSDM for UDOT engineers to determine the effectiveness of improvement alternatives.
3. Evaluate how IHSDM can be incorporated with safety audit practices
4. Prepare a training course on use of IHSDM for UDOT engineers.

3. List the major tasks required to accomplish the research objective(s): Estimated person-hours: 1,400 hrs

1. Literature search focusing on safety and design integrity evaluation practices and safety audit of rural two-lane highways
2. Select at minimum three rural highway sections with high, medium, and low historical crash history
3. Collect geometric, traffic, and control data for the selected highway sections
4. Evaluate the selected highway sections and diagnose their problems by IHSDM
5. Compare the output of the analysis and actual highway conditions
6. Identify potential "hot" spots and their possible improvements
7. Evaluate the effects of alternate improvements that are proposed
8. Evaluate how IHSDM can be incorporated in the design, evaluation, and safety audit of two-lane rural highways
9. Develop a training course on IHSDM for UDOT engineers
10. Write a final report

4. Outline the proposed schedule (when do you need this done, and how we will get there):

Start early June or July 2006, complete in June or July 2007.

5. Indicate type of research and / or development project this is:

Large: ☒ Research Project ☐ Development Project
Small: ☐ Research Evaluation ☐ Experimental Feature ☐ New Product Evaluation ☐ Tech Transfer Initiative :
☐ Other _____

6. What type of entity is best suited to perform this project (University, Consultant, UDOT Staff, Other Agency, Other)? University

7. What deliverable(s) would you like to receive at the end of the project? (e.g. useable technical product, design method, technique, training, workshops, report, manual of practice, policy, procedure, specification, standard, software, hardware, equipment, training tool, etc.)

1. Validation of the IHSDM
2. Proposal to UDOT to incorporate IHSDM in the process of two-lane highway safety evaluation, design, and improvement planning
3. Training course on use of IHSDM for safety audit of 2-lane highways

8. Describe how will this project be implemented at UDOT.

The IHSDM is available free of charge from FHWA. Part of the study is to find out how IHSDM fits UDOT's design process.

9. Describe how UDOT will benefit from the implementation of this project, and who the beneficiaries will be.

UDOT will have a tool and trained engineers who can interpret the designs in terms of safety, design integrity, policy compliance, and performance.

10. Describe the expected risks, obstacles, and strategies to overcome these.

* Reluctance of the engineers to use it. * Strategy – by education and training.

11. List the key UDOT Champion of this project (UDOT employee who will help Research Division steer and lead this project, and will spearhead the implementation of the results): Robert Hull, UDOT Safety Engineer (801-965-4273)

12. Estimate the cost of this research study including implementation effort (use person-hours from No. 3): \$35,000

13. List other champions (UDOT and non-UDOT) who are interested in and willing to participate in the Technical Advisory Committee for this study:

Name	Organization/Division/Region	Phone
A) Doug Anderson	UDOT R&D Division	801-965-4377
B) John Leonard	UDOT Traffic & Safety, Operations Engineer	801-965-4045
C) Robert Clayton	UDOT Traffic & Safety	801-965-4521
D) Peter Tang	UDOT Traffic & Safety	801-965-4285
E) Darin Duersch	Region 1 Traffic & Safety Engineer	801-620-1607
F) Tam Southwick	Region 2 SE Traffic & Safety Engineer	801-887-3717
G) Robert Miles	Region 2 NW Traffic & Safety Engineer	801-887-3792
H) Doug Bassett	Region 3 Traffic & Safety Engineer	801-227-8019
I) Troy Torgersen	Region 4 Traffic & Safety Engineer	435-893-4707

14. Identify other Utah agencies, regional or national agencies, or other groups that may have an interest in supporting this study: FHWA